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Title: **Yarn delivery device**

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CLAIMS

1. Yarn delivery device for textile machines, with a housing in which is fitted a drive shaft with a storage drum and with at least one belt pulley for a drive belt that drives several yarn delivery devices together,
characterised in that
it comprises a lever (14) with two arms that can swivel to a restricted extent about the drive shaft (6), the said lever having a drive belt lifting roller (16, 17) fitted and able to rotate freely on each arm of the lever, the maximum distance of the said lifting rollers from the axis of the drive shaft being greater than the radius of the belt pulley (10), such that the lever (14) can be swivelled from a rest position to a lifting position in which the two lifting rollers (16, 17) take up positions which, viewed along the belt rotation direction and the drive shaft circumference direction, are in each case on the far side of the central contact point (24) between the belt (20) and the belt pulley (10) when the arm of the lever (14) is in its rest position.

2. Yarn delivery device according to Claim 1,
characterised in that
each lever arm supports several coaxial lifting rollers or a common lifting roller (16, 17) for several drive belts (20) guided parallel to one another.

3. Yarn delivery device according to Claims 1 and 2,
characterised in that
the two-arm lever is formed as a pair of levers (14, 15) and the several coaxial lifting rollers or common lifting rollers (16, 17) are mounted on axles extending between the two individual levers (14, 15).

4. Yarn delivery device according to any of Claims 1 to 3,
characterised in that
the swivel path of the two-arm lever (14, 15) is restricted in both directions by an end-stop (22) arranged on the housing (3).

5. Yarn delivery device according to any of Claims 1 to 4,
characterised in that
at least in its rest position, the two-arm lever (14, 15) is secured by a detent device (25).

Yarn delivery device

The invention relates to a yarn delivery device for textile machines, with a holder in which is fitted a drive shaft with a storage drum and with at least one belt pulley for a drive belt that drives several yarn delivery devices together.

The purpose of the invention is to provide a yarn delivery device of the said type with a universally effective mechanism for discontinuing the drive intermittently and at arbitrarily chosen times.

This objective is achieved by a two-arm lever that can swivel to a restricted extent about a drive shaft, with a drive belt lifting roller fitted and able to rotate freely on each arm of the lever, the maximum distance of the said rollers from the axis of the drive shaft being greater than the radius of the belt pulley, such that the lever can be swivelled from a rest position to a lifting position in which the two lifting rollers take up positions which, viewed along the belt rotation direction and the drive shaft circumference direction, are in each case on the far side of the central contact point between the belt and the belt pulley when the lever arm is in its rest position.

By simply swivelling the two-arm lever from its rest position to its lifting position, a drive belt can be lifted clear of the belt pulley, regardless of whether the belt is running clockwise on one side of the belt pulley or anti-clockwise on the other side thereof. Since in its lifting position the two-arm lever is swivelled beyond the contact symmetry plane determined by the central contact point between the drive belt and the belt pulley, the lever remains in its lifting position by virtue of the tension in the belt running over one of the two lifting rollers.

Advantageously, the yarn delivery device can support on each lever arm several coaxial lifting rollers for several drive belts guided parallel to one another, and can therefore be adapted to machines in which a multiplicity of yarn delivery devices is divided into several groups, each driven by a separate drive belt. In this, it is usual for the several drive belts to be guided parallel to one another in those areas where they

coincide. The last-mentioned design form is also appropriate for proposed yarn delivery devices of the type described at the start, in which between two bearing point of the drive shaft a single belt pulley is arranged and can be adjusted by a detent device to occupy one of several predetermined operating positions.

The swivelling of the two-arm lever can be restricted in both directions by a single end-stop arranged on the holder. In addition, at least in its rest position, the two-arm lever can be secured by a detent device.

An example embodiment of a yarn delivery device according to the invention is illustrated in the attached drawing, which shows:

Fig.1: Side view of the yarn delivery device, with its most important components
Fig. 2: Sectional view along the plane II-II with the lifting device in its lifting position
Fig. 3: The sectional view of Fig. 2 with the belt lifting device in its rest position

The drawing shows a yarn delivery device provided in particular for circular knitting machines. Fig. 1 shows the lower support ring 1 and the upper support ring 2 of a circular knitting machine, on which yarn delivery devices are attached or supported at the circumference of the machine.

The yarn delivery device itself consists of a housing 3 with a rear holding portion 4 comprising a recess 5 for the insertion of the support ring 1 of the circular knitting machine. The holding rail 1 can be provided in a known way with current contact rails, from which, via contact points not shown in detail,, current can be drawn off for the electric circuits and switchgear of the yarn delivery device located in the housing 3.

In the housing is fitted a drive shaft 6, which passes vertically through the housing 3 and to the bottom end of which is attached a storage drum 7. Around the storage drum 7 are wound several turns of a yarn 11 which comes from a yarn spool (not shown) and is first led over a braking cylinder 12 and then passes from the storage drum 7 through yarn guide eyelets 13 to a processing position (also not shown).

At its upper end the drive shaft 6 is mounted in a web 8 supported on the upper support ring 2 of the machine via an adjustment screw 9. On the drive shaft 6 a belt pulley 10 is attached so that it can adopt any one of four different chosen height positions defined by detent devices (not shown). The pulley is shown in its lowest such position, and is also indicated by broken lines in a higher position.

The yarn delivery device is provided with a drive belt lifting device consisting of a pair of identical two-arm levers 14 and 15, fitted a distance apart from one another on the drive shaft 6 and able to swivel about it. Between the respective free ends of the two levers 14 and 15 extends in each case a lifting roller 16 and 17, which is mounted so that it can rotate freely, most appropriately on an axle connecting the two levers 14 and 15. The lifting rollers 16 and 17 are profiled and divided by intermediate and edge beads 18 into four belt contact zones 19 separate from one another, such that up to four belts 20 running parallel to one another, one of which is indicated in a partial top view in Fig. 1, can be lifted at the same time.

Figs. 2 and 3 each show a top view of the two-arm lever 14 of the drive belt lifting device. Fig. 2 shows the lifting device in its lifting position. From the figures it can be seen that the two lifting rollers 16 and 17 are positioned a distance away from the drive shaft 6 that forms the swivel axis of the two-arm lever 14, which exceeds the diameter of the belt pulley 10 also arranged on the drive shaft 6. Because of this, in the lifting position shown in Fig. 2 the belt 20 is in contact with the lifting roller 16 and is lifted clear of the belt pulley 10, so that the belt pulley 10 is no longer being driven. The running direction of the belt is indicated by an arrow 21. In this running direction, when the belt is in contact with the belt pulley 10, the latter rotates in the anti-clockwise direction. As indicated by a broken line 20', however, the belt 20' could also be led past the other side of the belt pulley 10, and in that case the lifted position shown in Fig. 2 would be brought about by the lifting roller 17.

An end-stop pin 22 attached on the housing 3 restricts the swivelling movement of the two-arm lever 14. In the lifting position the lever 14 swivels away from its rest position shown in Fig. 3 through more than 90°, so that the lifting roller 16 moves beyond the symmetry plane of the yarn delivery device indicated by the dot-dash line 23. Accordingly, viewed along the running direction 21 of the belt, the lifted belt 20

rests on the lifting roller 16 on the far side of the central contact point 24 between the belt 20 and the pelt pulley 10 located in the symmetry plane 23, whereby the belt tension exerts a turning moment on the lifting device in the anti-clockwise direction and so holds the two-arm lever 14 in contact against the end-stop pin 22. In the same way, when the belt 20' is running over the lifting roller 17, the belt exerts a contact pressure on the lifting device, which prevents the lifting device from returning to its rest position and keeps it pressed against the end-stop pin 22.

In the rest position of the lifting device shown in Fig. 3, the two lifting rollers 16 and 17 of the two-arm levers 14 and 15 are clear of the belts 20 or 20', so that over a certain portion of the circumference of the belt pulley 10 the belt 20 is in contact with it, at its central contact point 24. In the rest position as well, the two-arm lever 14 is in contact with the end-stop pin 22. To prevent undesired swivelling into the lifting position, it can be secured by means of a detent device (not shown in greater detail) in the form of a spring-loaded detent ball 25.

Translator's Notes

1. *Please see Fig. 2:*

   At various points in the text (e.g. towards the end of Claim 1), the position of a lifting roller is described as "behind" (German: hinter) the central contact point 24 when viewed along the direction in which the belt is moving.

   It struck me that this is ambiguous, if not indeed misleading. If I am looking along a **direction of movement** and can see two objects A and B, A being closer to me than B, there are some who would say that (**relative to the direction of movement**) A was "behind" B, while others might say that regardless of the direction of movement (i.e. relative to myself), since A is nearer me, it is "in front of" B.

   To dispel this ambiguity, I have deliberately mistranslated (or rather, interpreted) the word "hinter" as "on the far side of".

2. *Original, page 8, 5 lines from the bottom of the long paragraph:*

   The belt position 20' is said to be indicated by a broken (dotted, or dashed) line.

   The line in Fig. 2, however, is not broken. (Try some Tippex.)

3. *Original, page 9, line 1:*

   The so-called "dot-dash" line 23 is not very clearly dot-dashed in Figs. 2 and 3. (Tippex again.)

   More seriously, the index number 23 has been omitted from both figures and is nowhere to be found.

4. *Original, page 9, line 3:*

   The belt indexed as **21** should be belt **20** (21 being its direction of movement).

   Since no request to provide a "verified" the translation was made, I have taken the liberty of correcting this small error.

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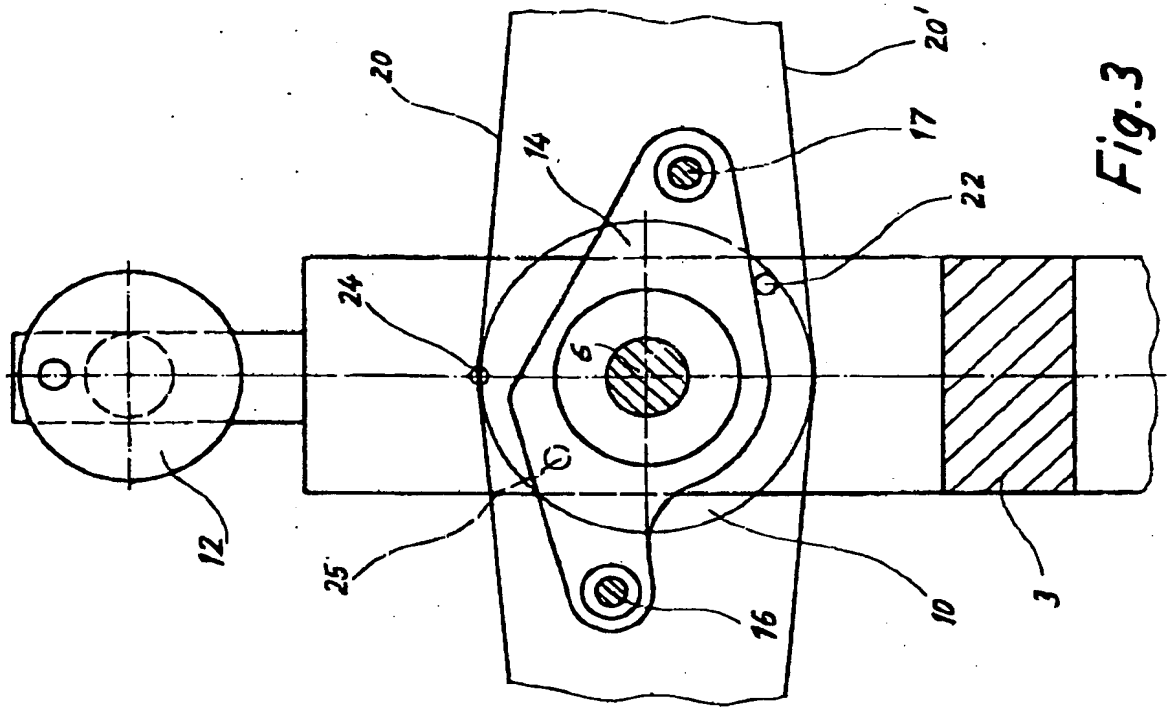

Fig.3

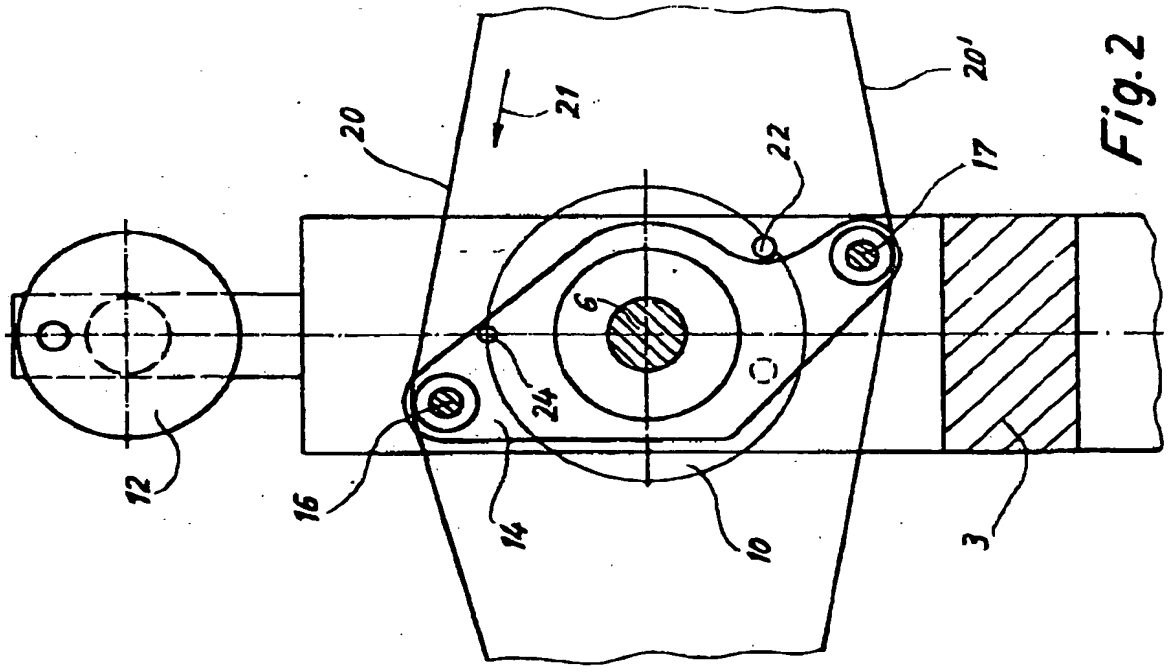

Fig.2

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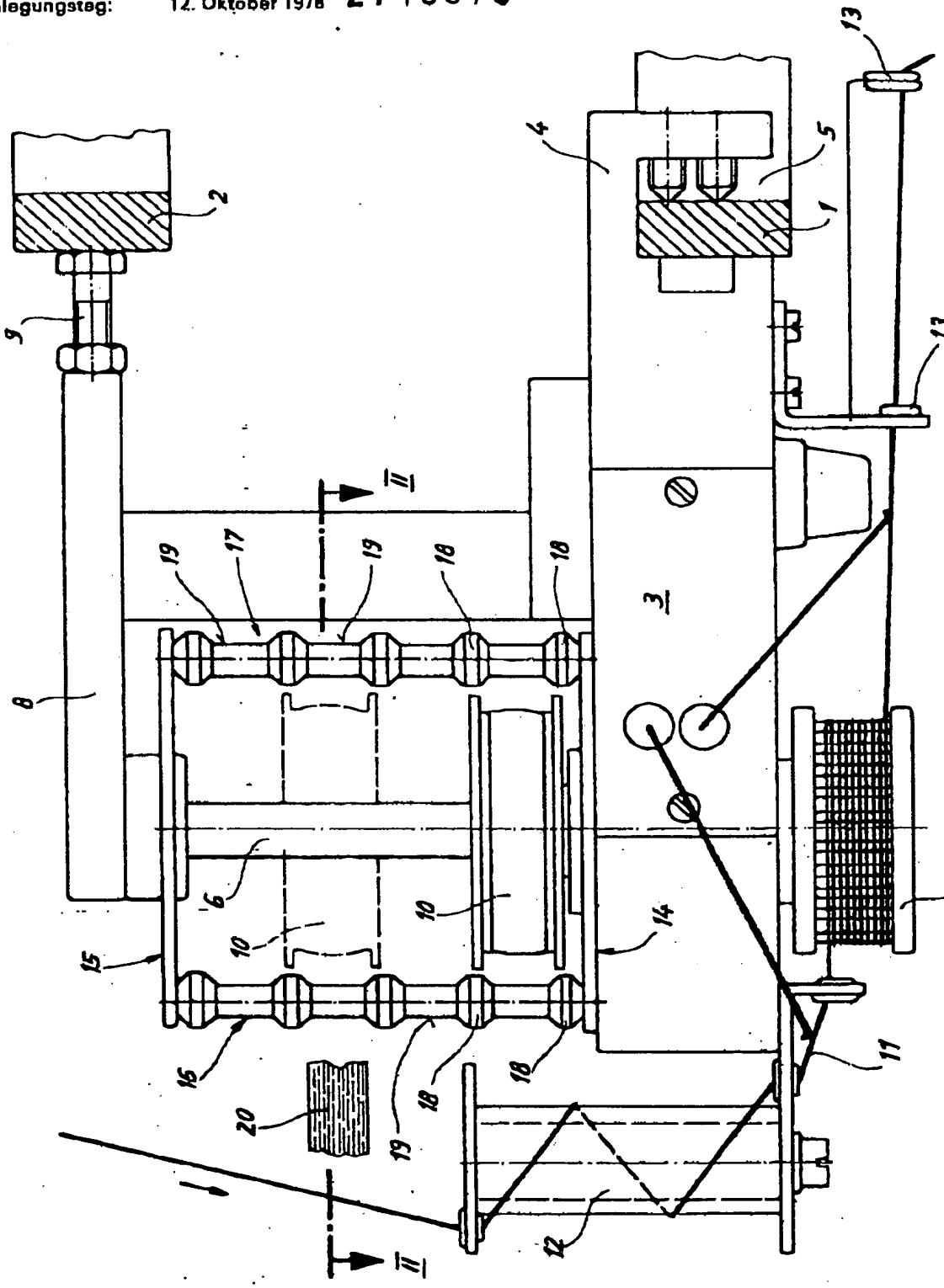

Fig.1

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